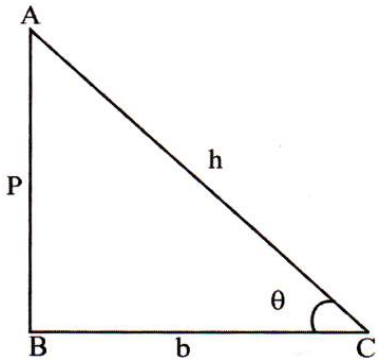
TRIGONOMETRY

FUNDAMENTALS

- Trigonometry is the study of relationship between the sides and angles of a triangle.

Trigonometrical ratio

- Trigonometric ratio of angle in a right angled AABC are defined as follows:



$$\sin\theta = \frac{AB}{AC} = \frac{P}{h}$$

$$Cos\theta = \frac{AB}{AC} = \frac{b}{h}$$

$$\tan\theta = \frac{AB}{AC} = \frac{p}{b}$$

The ratio $\text{cosec}\theta, \sec\theta$ and $\cot\theta$ are respectively the reciprocals of the $sin\theta, cos\theta$ and $tan\theta$.

i.e., $\sin\theta = \frac{1}{\text{cosec}\,\theta}, \cos\theta = \frac{1}{\sec\theta}$ and $\tan\theta = \frac{1}{\cot\theta}$

Trigonometric ratio of some specific angles

$\angle\theta$	0^o	30^o	45^o	60^o	90^o
$\sin\theta$	0	$\frac{1}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{\sqrt{3}}{2}$	1
$\cos\theta$	1	$\frac{\sqrt{3}}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{1}{2}$	0
$\tan\theta$	0	$\frac{1}{\sqrt{3}}$	1	$\sqrt{3}$	Not defined
$\text{cosec}\theta$	Not defined	2	$\sqrt{2}$	2	1
$\sec\theta$	1	$\frac{2}{\sqrt{3}}$	$\sqrt{2}$	2	Not defined
$\cot\theta$	Not defined	$\sqrt{3}$	1	$\frac{1}{\sqrt{3}}$	0

- $\sin^2\theta + cos^2\theta = 1$
- $sec^2\theta - tan^2\theta = 1$
- $cosec^2\theta - cot^2\theta = 1$
- $\sin\left(90^\circ - \theta\right) = cos\theta;\ cos\left(90^\circ - \theta\right) = sin\theta$
- $sec\left(90^\circ - \theta\right) = cosec\theta;\ cosec\left(90^\circ - \theta\right) = sec\theta$
- $tan\left(90^\circ - \theta\right) = cot\theta;\ cot\left(90^\circ - \theta\right) = tan\theta$